Hilger spectrograph of the autocolimating type, with very large prisms, and apparently capable of yielding excellent spectra on a large scale. The members of the regular staff of chemists at the Station, under the direction of Dr. R. B. Moore, are too much occupied with their regular duties to undertake special spectroscopic researches. Therefore this fine instrument has not been utilized as it might be. An unusual chance is thus presented for the establishment of a fellowship for spectroscopic research, under the joint auspices of the station and of some university, physical laboratory or scientific fund.

A second consideration of immediate importance lies in the fact that Golden is situated near the central line of the total eclipse of June 8. American science could be accused of grievous neglect, if this spectrograph, already in the eclipse track, should not be used on that occasion by an expert spectroscopist. To many such I have written personally during recent months, urging that the opportunity be improved; but as a result of war duties or the shortage of assistants in the laboratories, thus far no one has been found who could undertake the work.

It would be necessary for the person to go to Golden early enough in May, so that the spectrograph could be put into excellent adjustment and then to mount it where a clear view of the northwestern sky could be had. The necessary heliostat could doubtless be borrowed from some laboratory. The altitude of Golden is 5,700 feet, and if the foliage around the station building was too heavy in June, it would not be at all difficult to transport the spectrograph up to an elevation of about 7,500 feet on Lookout Mountain, where Colonel Cody was buried.

The ideal arrangement will of course be for this same person who gets familiar with this spectrograph to continue in research with it after the eclipse. If a suitable person is found, an effort can be made to raise the necessary funds for a fellowship or other basis which may be arranged for the work.

Time might perhaps be saved for those who may wish to consider the observation of the eclipse with this instrument, if they will write to me directly.

I am writing this at the request of Dr. Charles L. Parsons, of the Bureau of Mines, and Dr. Moore. EDWIN B. FROST

YERKES OBSERVATORY,
WILLIAMS BAY, WISCONSIN,
April 13, 1918

THE DESICCATION OF THE EARTH

TO THE EDITOR OF SCIENCE: In Notes on Meteorology and Climatology in the issue of SCIENCE for October 21, 1910, attention is invited to an article in *Umschau* by Dr. Karl Stoeckel which helps to explain the slow desiccation of the earth.

> It is believed that the ultra-violet rays of sunlight which fall upon the water vapor suspended in the lower strata of the earth's atmosphere decompose a small part of it to produce hydrogen, which rises to great heights. . . .

I do not think it has been pointed out before that the earth's surface must be continuously losing hydrogen through the decomposition of water vapor by every flash of lightning. Pickering and others have recognized the hydrogen lines in the spectrum of lightning, and the larger works on meteorology mention the fact that lightning flashes decompose some water. See Hann's "Lehrbuch der Meteorologie," 2d edition, page 480:

> But the electric flash also decomposes some water and causes the incandescence of the hydrogen.

The hydrogen formed by every lightning flash rises rapidly to the upper atmosphere and is lost to the earth.

Considering the frequency of thunderstorms during the summer season in both hemispheres and at all times in the equatorial regions the loss of hydrogen in this way can not be considered as insignificant. As long as conditions upon the earth remain such as to render thunderstorms possible, the slow desiccation of the earth must continue.

C. F. VON HERRMANN

AREAS OF AUDIBILITY

TO THE EDITOR OF SCIENCE: Students of the constitution of the atmosphere have published

very interesting results as a consequence of the investigation of areas of audibility and *inaudibility* surrounding great sources of sound, such as the blasting for the Jungfraubahn, the bombardment of Antwerp, a munition explosion in England, etc. It seems natural that the Halifax explosion, violent enough to break glass many miles distant and to be heard scores of miles away at sea, should be investigated the same way; but I have read and heard nothing of any such study. It is, of course, a matter for the scientists of the neighboring region, and perhaps they have taken it up.

Willard J. Fisher

PRIMITIVE KNOWLEDGE OF INOCULATION

In an article on "The Origin of the Custom of Tea Drinking in China," Science, March 15, R. A. Gortner remarks that "it is extremely improbable that it was recognized centuries ago that typhoid fevers, etc., were disseminated by pollution of the water supply, especially inasmuch as there was no knowledge of microorganisms or of the rôle which they play in disease until the work of Pasteur (1857–1863)." In adopting this conclusion as *a priori* valid it seems to me that Gortner is in danger of making the same error that was made by Sir Richard Burton in 1854. Burton states ("First Footsteps in East Africa") that "The mosquito bites bring on, according to the same authority (the Somal), deadly fevers; the superstition probably arises from the fact that mosquitoes and fevers become formidable about the same time." This is not the only case, we may be sure, in which causal relations have been recognized long before the causal mechanism was known.

Knight Dunlap

SCIENTIFIC BOOKS

The Anthocyanin Pigments of Plants. By Muriel Wheldale. Cambridge University Press. 1916. Royal 8vo. Pp. xii + 318. Price 15s net.

The science of chemistry has grown so rapidly during recent years that it is impossible for an individual to acquire a thorough knowledge of all of its branches, and even to master a single phase of the science often means laborious searchings through the chemical literature. Fortunately there have appeared during the last decade a number of monographs, each written by an authority in that particular field, which deal thoroughly with a special topic and sum up all of the available literature. Such a compilation is the present volume.

What causes the production of the colors in a flower? Every one has asked himself the question and numerous chemists have attacked the problem, yet it is only within recent years that any definite knowledge has been attained and we still have a long way to progress before we know the whole truth. It is fortunate, however, that Miss Wheldale has accumulated such evidence as is at present available.

Her studies of anthocyanin began with a study of the genetical behavior of these pigments, but she soon ascertained that biological phenomena have for their basis chemical reactions, with the result that she undertook to analyze the chemical changes which were involved in the hereditary behavior of flower coloration. The present volume is divided into two parts. Under Part I., "General Account of Anthocyanins," we have "Introductory," consisting mainly of the older literature of the subject; "The Morphological Distribution of Anthocyanins"; "The Histological Distribution of Anthocyanins"; "The Properties and Reactions of Anthocyanins"; "The Isolation and Constitution of Anthocyanins"; "Physiological Conditions and Factors Influencing the Formation of Anthocyanins"; "Reactions Involved in the Formation of Anthocyanins"; and "The Significance of Anthocyanins," practically all of which are taken up from the chemical viewpoint.

Under Part II., "Anthocyanin and Genetics," we find "Classes of Variation"; "Details of Cases of Mendelian Inheritance in Color Varieties"; "Connection of Flower Color with the Presence of Anthocyanin Vegetative Organs, Fruits and Seeds"; "Heterozygous Forms"; "Color Factors in Reduplication